entailments from data obtained from repertory grids provided by domain experts. These entailments can provide a basis for the automatic generation of rules for expert systems.

Rather than the conventional distance-based cluster-analytic approaches or the more recent fuzzy set approaches, this paper proposes a logic of confirmation analysis in which repertory grid data can be viewed as a collection of two-dimensional arrays. These arrays, referred to as α planes, are used for the derivation of entailments.

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A Utility-Valued Logic for Decision Making

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In this paper a logic particularly appropriate for decision-making applications is described. In order to express beliefs, the notion of a sentence is replaced by that of an assertion. It is then natural to take the corresponding "truth value" to be the utility associated, as in standard decision theory, with the act of making the assertion, and connectives become ordinary real-valued functions. The representation of decision-making rules (in the sense of expert systems) as assertions is studied, and it is shown that common but moderately sophisticated rules (including degrees of belief and limiting conditions) admit a very simple representation involving only linear functions. The structure of the corresponding formal logic in which variables are used to denote arbitrary assertions is briefly described. It turns out that this logic admits a deductive method closely analogous to Robinson's method of resolution. Using this method, a problem in deduction in the logic of assertions becomes a problem in linear programming, and the assertional form of resolution coincides with Fourier's method for solving such problems.

An Improved Method of Performing Fuzzy Arithmetic for Computer Vision

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In computer vision, we often have the capability of looking at a scene through several different sensors and/or of looking at a time sequence of images from the scene. The theory of fuzzy sets offers a powerful and natural way of calculating an overall confidence in the classification based on the confidence measures from these multiple images; however, it is difficult to perform these operations quickly and accurately. This paper presents a way of representing fuzzy numbers and performing computations with them based on a λ-cutset representation of fuzzy sets and using interval arithmetic. The λ-cutset algorithm, particularly the authors' version of the algorithm restricted to the positive real numbers, provides a much faster and more efficient way of performing calculations with fuzzy numbers than the approximate discretization approach. In

addition, the authors establish that the accuracy of the λ-cutset algorithm can be improved as much as desired by increasing the number of intervals and that the computation time increases linearly with the number of intervals (unlike the discrete approach, where computation time increases exponentially as the number of points is increased). These characteristics make this approach a very powerful way of performing fuzzy arithmetic for both risk analysis and computer vision.

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On the Choice of Ply Operators for Modus Ponens Generation in Fuzzy Intelligent Systems

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In an expert or intelligent system that uses fuzzy modus ponens for reasoning, the choice of ply (implication) operator is crucial. Different operators may endow the system with different characteristics. The system may not provide the required expertise with some of the operators. Eleven operators have been classified into three categories and their properties studied in a theoretical manner. Modus ponens generating functions provide the value for the consequent. A minimal set of desired properties for the ply operator is detailed. Theoretical performance is compared with practical performance in the Fess system. Some comments on results from another empirical study are provided. A criterion for choosing a ply operator is given with justifications.

Field Testing the STRATASSIST Prototype

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Initial testing of the STRATASSIST prototype for strategic planning decision support was encouraging. It demonstrated that the assistance of the two modules tested made a statistically significant difference in the task performance of the treatment groups compared to the control groups. Interaction effects between the work experience levels of the subjects and the treatment levels they received required further study. Discriminant analysis of subject demographic information and responses on follow-up questionnaires confirmed the need to improve the output from the fuzzy expert system module. It also supported the advisability of offering processing by this module as an option rather than a necessary feature of the DSS. These changes are being implemented as the software is programmed. As an alternative processing method for information in the strategic database, a color graphics module is now ready to program. This module will present the information visually so that users can discover for themselves the significant relationships for their strategic planning. It is anticipated that users with varied experience levels will benefit from this assistance.